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BUREAU OF SHIPS GROUP TECHNICAL INSPECTION REPORT

Classification (~~Secret~~) (Changed to **CONFIDENTIAL**)
By Authority of Joint Chiefs of Staff (Action 15 Apr 49)

By John Beggs, Capt Date 24 April 51

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⑥ OPERATION CROSSROADS.

U.S.S. STACK (DD 406)

Director
Defense Atomic Support Agency
Washington, D. C. 20301

TEST ABLE [U].

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BUREAU OF SHIPS GROUP
TECHNICAL INSPECTION REPORT

Classification (~~Cancelled~~) (Changed to **CONFIDENTIAL**)
By Authority of Joint Chiefs of Staff (Action 15 Apr 49)
John R. Kelly, Capt Date *24 April 51*
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USS STACK (DD406)

Page 1 of 87 Pages

1 JAN 1965

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SECRET

USS STACK (DD406)

U.S.S. STACK (DD406)

SHIP CHARACTERISTICS

Building Yard: Norfolk Naval Shipyard.

Commissioned: 20 November 1939.

HULL

Length Overall: 340 feet 9 inches.

Length on Waterline: 334 feet 0 inches.

Beam (extreme): 35 feet 6 inches.

Depth (molded at side, to main deck, amidships):
19 feet 7 7/8 inches.

Drafts at time of test: Fwd. 14 feet 0 inches.

Aft. 12 feet 8 inches.

Standard displacement: 1,500 tons.

Displacement at time of test: 2,376 tons.

MAIN PROPULSION PLANT

Main Engines: Two sets of Westinghouse turbines
are installed, one set per shaft.

Reduction Gears: Two sets of "westinghouse" double
reduction are installed, one per shaft.

Main Condensers: Two are installed in ship.

Boilers: three babcock and Wilcox boilers are in-
stalled in ship. 565 psi. gauge - 705° F.

Propellers: Two are installed in ship.

Main Shafts: Two are installed.

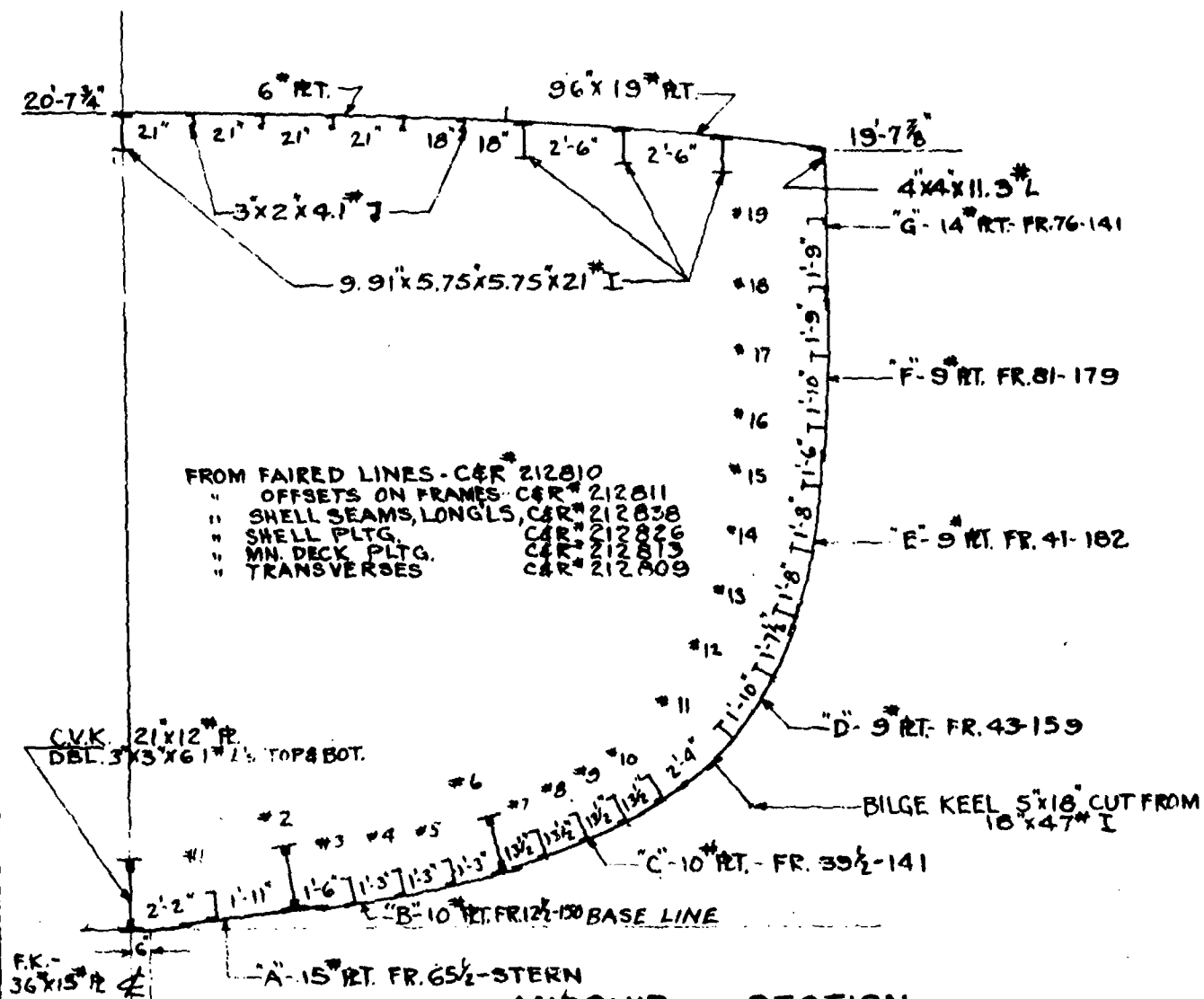
Ships Service Generators: Four are installed in ship
two 132 KW. - A.C., and two 40 KW. - D.C. sets.

SECRET

USS STACK (DD406)

LONG L 1 - 9x2 1/2 x 13.4 C
 " 2 - 19 1/4 x 7 RT. 3x2x4.1 L
 " 3-4-5- 8x2 1/2 x 11.5 C
 " 6-17x7 RT. 3x2x4.1 L
 " 7-8-9-10-8x2 1/2 x 11.5 C
 " 11-12-13-14- 6x3.06x5.87 T's
 " 15-16-17- 5x2.69x4.48 T's
 " 18-19- 5x1 1/4 x 1 1/4 x 6.7 C

7.65 WEB SPCLD - 7'-0"
 KEEL BKT. SPCLD. - EVERY FRAME



MIDSHIP SECTION

TEST A

SECRET

USS STACK (DD 406)

TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test, general areas of flooding, sources.

No flooding occurred in this ship, consequently there was no change in draft or list.

(b) Structural Damage.

HULL

Structural damage is superficial. Panel dishing of weather bulkheads and doors occurred above the main deck level, principally in bulkheads facing to starboard. Maximum dishing is of the order of three inches. Local dishing of the starboard shell plating above the waterline occurred to a maximum depth of one inch. In way of shell dishing, framing is distorted at frames 10, 21, 32 82, 86 and 122. Some damage occurred to rigging, antennae and halyards. The stack breeching is dished and torn.

MACHINERY

A few seams were opened in the outer casing of the breeching between stack and uptakes, above the main deck. This does not impair operation.

ELECTRICAL

No structural damage to electrical equipment occurred.

(c) Other damage.

HULL

No comment.

SECRET.

USS STACK (DD406)

MACHINERY

About 50% of the lagging was torn off the steam supply line to the whistle and siren, above the main deck. This does not impair operation. There is no other damage to machinery.

ELECTRICAL

No damage to electrical machinery, ship control or fire control occurred.

II. Forces Evidenced and Effects Noted.

(a) Heat.

HULL

Heat come from a bearing of approximately 22 degrees relative. Scorching of paint work and manila lines is heavy and in some cases reached the ignition point, as evidenced by smoke smudges. Gun bloomers, life raft covers, and fire hoses are scorched.

MACHINERY

Paint on exposed machinery was scorched and blistered.

ELECTRICAL

Radiation came from about 45° relative. Slight damage was done to painted surfaces of exposed cable and searchlight train and elevation indicator dial glasses by scorching.

(b) Fires and explosions.

HULL

No explosions occurred. Flag halyards, the anchor ball, pilot house windshield wipers, and degaussing cables burned.

SECRET

USS STACK (DD406)

MACHINERY

No evidence.

ELECTRICAL

No fires or explosions occurred.

(c) Shock.

HULL

Shock effect is slight. Some electronics damage occurred in Radio Control. A rangefinder stable element was jarred out of its gimble forks. Power fuses in the pilot house jumped out of clips. Ammunition fell from gun bulwark ready racks.

MACHINERY

No evidence.

ELECTRICAL

No damage by shock to electrical equipment occurred.

(d) Pressure

HULL

Blast pressure came from approximately 22 degrees relative. Panel dishing of weather bulkheads occurred to plating 3/16 inch in thickness. Light dishing of the starboard shell occurred in plating varying in weight from nine pounds to fourteen pounds.

MACHINERY

Blast pressure opened a few seams in the outer casing of the uptake breeching, and tore off part of the lagging on the steam line to the whistle and siren. The blast came from starboard.

SECRET

USS STACK (DD406)

ELECTRICAL

Slight electrical damage occurred as follows:

The special code 660 material, PAE speaker amplifier box collapsed from external pressure.

(e) Effects peculiar to the Atom Bomb.

HULL

The only effect apparently peculiar to the Atom Bomb is that of extreme heat.

MACHINERY

Blast pressure slight enough to have noticeable effect at such a distance from an explosion is apparently peculiar to the Atom Bomb.

ELECTRICAL

None other than radioactivity.

III. Effects of Damage.

(a) Effect on machinery, electrical, and ship control.

HULL

Propulsion and auxiliary machinery remains undamaged. Electrical and ship control equipment is essentially unaffected.

MACHINERY

None. The ship changed berths under her own power after Test A, at which time all machinery was operated, and functioned normally.

SECRET

USS STACK (DD406)

ELECTRICAL

No damage occurred.

(b) Effect on gunnery and fire control.

HULL

Gunnery and fire control equipment are affected only to a very slight degree. Some damage occurred to gun director and rangefinder shields.

MACHINERY

No comment.

ELECTRICAL

No damage occurred electrically.

(c) Effect on watertight integrity and stability.

HULL

Watertight integrity and stability are not affected.

MACHINERY

No comment.

ELECTRICAL

No effect occurred due to electrical equipment.

(d) Effect on personnel and habitability.

HULL

SECRET

USS STACK (DD406)

Exposed topside personnel, as well as those in the main director and possibly CIC, probably would have been killed by the blast. Personnel in the forward 5"/38 gun shields, pilot house, and radio room would possibly have been badly injured.

MACHINERY

None below decks.

ELECTRICAL

No effect occurred due to electrical equipment.

(e) Effect on fighting efficiency.

HULL

Fighting efficiency would have been impaired only in proportion to the extent of injuries to personnel.

MACHINERY

None.

ELECTRICAL

No effect on fighting efficiency occurred due to electrical equipment.

IV. General Summary of Observers' Impressions and Conclusions.

HULL

At the distance of this vessel from an Atomic Bomb blast, panel dishing of structure, damage to miscellaneous top side gear, and serious casualties to exposed personnel can be expected.

MACHINERY

The STACK was outside the effective range of the explosion in Test A.

SECRET

USS STACK (DD406)

ELECTRICAL

This vessel, due to distance from the blast suffered no major damage and could have carried out its mission as a fighting ship.

V. Preliminary General or Specific Recommendations of Inspection Group.

HULL

More adequate protection from the effects of air blast and heat is needed for topside personnel. Improvement in the strength of doors, and stiffening of flat surfaces in the vicinity of such openings, is indicated. Provision should be made for more adequate securing of miscellaneous topside gear such as ladders, flag bags, and air port lenses. Weather bulkheads and gun bulwarks should be constructed of not less than 10 pound plate.

MACHINERY

None.

ELECTRICAL

None.

SECRET

USS STACK (DD406)

TECHNICAL INSPECTION REPORT

SECTION I - HULL

GENERAL SUMMARY OF HULL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No flooding occurred in this ship, consequently there was no change in draft or list.

(b) Structural damage.

Structural damage is superficial. Panel dishing of weather bulkheads and doors occurred above the main deck level, principally in bulkheads facing to starboard. Maximum dishing is of the order of three inches. Local dishing of the starboard shell plating above the waterline occurred to a maximum depth of one inch. In way of shell dishing, framing is distorted at frames 10, 21, 32, 82, 86, and 122. Some damage occurred to rigging, antennae and halyards. The stack breeching is dished and torn.

(c) Other damage.

No comment.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Heat come from a bearing of approximately 22° relative. Scorching of paint work and manila lines is heavy and in some cases reached the ignition point, as evidenced by smoke smudges. Gun bloomers, life raft covers, and fire hoses are scorched.

SECRET

USS STACK (DD406)

(b) Fires and explosions.

No explosions occurred. Flag halyards, the anchor ball, pilot house windshield wipers, and degaussing cables burned.

(c) Shock.

Shock effect is slight. Some electronics damage occurred in Radio Control. A rangefinder stable element was jarred out of its gimble forks. Power fuses in the pilot house jumped out of clips. Ammunition fell from gun bulwark ready racks.

(d) Pressure.

Blast pressure came from approximately 22° relative. Panel dishing of weather bulkheads occurred to plating 3/16 inch in thickness. Light dishing of the starboard shell occurred in plating varying in weight from nine pounds to fourteen pounds.

(e) Effects apparently peculiar to the atom bomb.

The only effect apparently peculiar to the atom bomb is that of extreme heat.

III. Effects of Damage.

(a) Effect on machinery, electrical and ship control.

Propulsion and auxiliary machinery remains undamaged. Electrical and ship control equipment is essentially unaffected.

(b) Effect on gunnery and fire control.

Gunnery and fire control equipment are affected only to a very slight degree. Some damage occurred to gun director and rangefinder shields.

SECRET

USS STACK (DD406)

(c) Effect on water-tight integrity and stability.

Water-tight integrity and stability are not affected.

(d) Effect on personnel and habitability.

Exposed topside personnel, as well as those in the main director and possibly CIC, probably would have been killed by the blast. Personnel in the forward 5"/38 gun shields, pilot house and radio room would possibly have been badly injured.

(e) Effect on fighting efficiency.

Fighting efficiency would have been impaired only in proportion to the extent of injuries to personnel.

IV. General Summary of Observers' Impressions and Conclusions.

At the distance of this vessel from an atomic bomb blast, panel dishing of structure, damage to miscellaneous top side gear, and serious casualties to exposed personnel can be expected.

V. Preliminary General or Specific Recommendations of Inspection Group.

More adequate protection from the effects of air blast and heat is needed for topside personnel. Improvement in the strength of doors, and stiffening of flat surfaces in the vicinity of such openings, is indicated. Provision should be made for more adequate securing of miscellaneous topside gear such as ladders, flag bags, and air port lenses. Weather bulkheads and gun bulwarks should be constructed of not less than 10 pound plate.

VI. Instructions for loading the vessel specified the following:

ITEM	LOADING
Fuel Oil	Full Load
Diesel Oil	Full Load
Ammunition	100%
Potable and reserve feed water	Full Load
Salt water ballast	None

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USS STACK (DD406)

Details of the actual quantities of the various items aboard are included in Report 7. Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

SECRET

USS STACK (DD406)

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DETAILED DESCRIPTION OF HULL DAMAGE

A. General Description of Hull Damage.

(a) Overall condition of vessel.

The blast struck this ship at an angle of approximately 22 degrees relative.

Structural damage is largely superficial. Equipment damage is minor. Paint damage is general on surfaces facing forward and to starboard. No fires of any consequence occurred. General photos of the ship are on pages 41 to 50

(b) General areas of hull damage.

In the superstructure, bulkheads and doors facing to starboard are moderately dished. Gun and director bulwarks on the starboard side are distorted. Some damage was sustained by the stack, stack breeching, mast yardarm, antennae, and halyards. Ladders and flagbags are distorted. Glass is damaged in the bridge structure.

Damage to the hull plating is negligible except for local dishing of the starboard shell. In way of areas of shell dishing, moderate distortion of shell framing occurred at frames 10, 21, 32, 82, 86, and 122. Dishing of the shell plating does not exceed a depth of one inch.

(c) Apparent causes of hull damage in each area.

All damage is considered to be the result of air blast pressure.

(d) Flooding.

No flooding occurred in this ship.

SECRET

USS STACK (DD406)

(e) Residual strength, buoyancy, operability.

Residual strength is essentially unimpaired.
Buoyancy and operability are not affected.

B. Superstructure.

(a) Description of damage.

The starboard side of the Mark 51 director bulwarks (5 lb. plate) is distorted. (Photo. 2006-12; page 51). Similarly, the 20 mm gun bulwarks (4-1/2 lb. plate), frame 100, starboard, are severely dished. (Photos. 2006-8, 1850-5; pages 52 , and 53). Six 15-inch glass air-ports in the pilot house are blown free of their retaining rings and one glass port is shattered. (Photo. 2006-12; page 51).

The stack is wrinkled on the starboard and forward sides, and lagging is stripped from the whistle and siren. (Photos. 1772-8, 2006-10, 1850-6; pages 54 , 55 , and 56). The stack starboard drain line is severed at an elbow. The top and starboard side of the uptake breeching are damaged. The most severe damage occurred to the forward breeching, which is severely dished and torn. (Photos. 2006-7, 2170-5,7,8,9,10; pages 57 , 58 , 59 , 60 , 61 , and 62).

Panel dishing as a result of blast pressure occurred as follows:

1. Torpedo tracking room and emergency cabin on the navigating bridge: After bulkhead, door, and door frame dished.
2. Radar transmitter room, superstructure deck: Starboard bulkhead dished.
3. CIC room, superstructure deck: Forward bulkhead slightly dished; starboard bulkhead, door and door frame dished approximately three inches, rivets sheared in a plating butt, and three stiffeners on starboard bulkhead forward of door frame are fractured. (Photo. 2006-11; page 63).

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USS STACK (DD406)

4. Small gear locker, superstructure deck, frame 68-70: starboard side dished.

5. Handling room A-0101 M, frames 37-43, forecastle deck: starboard bulkhead, door, and door frame dished.

6. Passage A-0103 L, frames 49-57-1/2, forecastle deck; starboard bulkhead, door, and door frame dished.

7. Radio room, frames 64-1/2 - 72-1/2, forecastle deck: starboard bulkhead, door, and door frame dished approximately three inches. (Photo. 2006-5; page 4). Damage to a locker inside the radio room, struck by a dog handle, indicates a three inch retraction of the bulkhead from a maximum deflection of six inches.

8. Pressing room, B-101 A, frames 67-72, main deck; starboard bulkhead, door, and door frame dished and bulkhead torn away from ventilation duct just forward of door.

9. Engineers Log Room, B-103 L, frames 97-102, main deck: starboard bulkhead, door and door frame dished. (Photos. 1850-7,8, pages 65 , and 66).

10. General workshop, B-104 E, frames 97-104, main deck: door and door frame, port side, dished.

11. Torpedo workshop, B-107E, frames 115-124, main deck: after bulkhead dished.

12. Repair party locker, B-108 A, frames 121-124, main deck: port quartering bulkhead, door, and door frame dished. (Photo. 2006-9; page 67).

13. Crews shower room, C-102ML, frames 139-1/2 - 147, main deck: starboard bulkhead slightly dished.

14. Handling room, C-102ML, frames 154-159, main deck: port quartering bulkhead slightly dished. Damage was sustained by miscellaneous topside structure and equipment as follows:

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USS STACK (DD406)

1. SC radar antennae are missing.
2. Foremast starboard headstay tang at truck sheared off and yard arm is rotated, 10 degrees; blinker lights are tilted aft. (Photo. 1772-7: page 35).
3. Recognition light globes on the foremast are shattered.
4. Radio antennae between the pilot house and stack are down.
5. Mark 33 director shield doors, door frames, hatches and hatch coamings are dished.
6. Mark 4 FD radar antennae di-poles are broken. Window on rangefinder operator station port, is shattered and the stable element is jarred out of gimble forks.
7. Loran antennae are broken away from the insulator inside of the chart house.
8. Windshield wipers for pilot house ports bent out of shape and burned.
9. The port flag bag is severely dished and the starboard bag is slightly dished. (Photo. 2008-3: page 69).
10. The ladder from the superstructure deck to the navigating bridge is blown up against the underside of the bridge wing and is distorted.
11. The trainers handwheel is blown off of the No. 2 5"/38 gun.
12. The fuse caps of one round of 5"/38 VT and two rounds of 20mm HEI are damaged.
13. Gun bloomers are ripped on Nos. 1 and 2 5"/38 guns.
14. A loud speaker is missing from the after deckhouse.
15. Life line stanchions along the starboard side are slightly bent.

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USS STACK (DD406)

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(b) Causes of damage in each area

Panel dishing is the result of blast pressure. Overhanging bridge structure failed to protect the partially sheltered starboard bulkheads below from dishing. Slight dishing occurred in bulkhead panels facing aft and to port, away from the general direction of the blast.

(c) Evidences of fire in superstructure.

No fires of any consequence occurred. Canvas was burned off the wire frame of the anchor ball. Flag halyards on the starboard side burned and the port side halyards scorched. Pilot house windshield wipers burned. Gun bloomers, life raft coverings, and fire hoses were scorched. Degaussing cables burned, port and starboard. Scorching of paint work and manila lines and hawsers was fairly heavy and in some instances reached the ignition point of the material as evidenced by smoke smudges. Apparently, many fires would have been started but for rapid dissipation of the heat by the air blast.

(d) Estimate of relative effectiveness of plating thickness.

The critical plating thickness for weather bulkheads, bulwarks, and gun enclosures is in excess of 3/16 of an inch, indicating that no plating less than 1/4 of an inch, thick should be used in topside structures exposed to air blast. Blast pressure was particularly effective against light plating in areas that were pocketed by projections above or at right angles to the affected area.

(e) Constructive criticism of superstructure design or construction.

Overhanging bridge structure should be eliminated. Adequate design of doors, door frames and flat surfaces is indicated. Provision should be made for more adequate securing of miscellaneous topside gear such as ladders, flagbags and bridge airport lenses. More adequate protection of topside personnel against the effects of blast and heat is necessary.

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USS SLACK (DD406)

C. Turrets, Guns and Directors.

Guns, directors, and rangefinders are essentially unaffected except for damage to shields. A trainers handwheel is blown off of No. 2 5"/38 gun.

D. Torpedo Mounts, Depth Charge Gear.

No damage is known to have occurred to torpedo or depth charge launching devices.

E. Weather Deck.

No damage occurred to weather decks, mooring and towing fittings, or boat handling equipment. The locations and recordings of scratch gages installed to measure deflection of the weather deck are tabulated on page 71.

F. Exterior Hull.

Local dishing of the starboard shell plating to a maximum depth of one inch occurred as a result of blast pressure. Shell framing, starboard, suffered moderate distortion at frames 10, 21, 32, 82, 86 and 122 in way of the shell dishing. It appears probable that some degree of irregularity of shell plating existed before Test A.

G. Interior Compartments (above w.l.).

Interior compartments are undamaged structurally except for distortion of shell framing and longitudinals in way of light dishing of the starboard shell plating above the waterline at frames 10, 21, 32, 82, 86, and 122. All compartments below decks are covered with fine dust blown or jarred loose from overhead wiring, sheathing, and ventilation ducts.

No damage to joiner bulkheads, or to furniture, is known to have occurred.

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USS STACK (DD406)

Some damage occurred to electronic equipment in Radio Central, due apparently to blast pressure entering to compartment by way of damaged doors.

A ventilation duct in the wardroom, frame 56, was blown from the bulkhead and against the wardroom table.

There is no reduction in watertight subdivision, habitability, or utility of compartments.

H. Armor Decks and Miscellaneous Armor.

Not Applicable.

I. Interior Compartments (below w.l.).

No damage is known to have occurred below the waterline.

J. Underwater Hull.

No damage is known to have occurred to the underwater hull, shafts, struts, propellers or rudder.

K. Tanks.

No damage to tanks has been reported.

L. Flooding.

No flooding occurred in this ship.

M. Ventilation.

Damage to the ventilation system is minor. In the wardroom, a ventilation duct was blown from bulkhead 56 against the wardroom table. Interior compartments are covered with dust blown or jarred from ducts, overhead wiring, and sheathing.

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USS STACK (DD406)

N. Ship Control.

Damage to ship control is negligible. In the pilot house, power fuses were jarred out of their panel clips and two recognition light switch box buttons were broken by flying glass. A "MN" phone holder was broken.

O. Fire Control.

Damage to fire control equipment is minor. The Mark 33 director sustained damage to shield doors, door frames, hatches, and hatch coamings. Two di-poles on the Mark 4 FD radar antennae are broken. A window in the rangefinder operator's station port, is shattered.

More effective protection against air blast is indicated for fire control equipment and personnel.

P. Ammunition Behavior,

One round of 5"/38 VT was jettisoned as a result of damage to the fuse cap when jarred from the gun shield ready rack for No. 2 gun. The fuse caps of two rounds of 20mm HEI in the starboard amidships AA ready box are damaged.

Q. Ammunition Handling.

No damage is known to have occurred to any ammunition handling device.

R. Strength.

There is no evidence of hog or sag or any impairment of the longitudinal strength of the ship. Evidence of panel deflection under blast exists in dishing of weather bulkheads, principally facing to starboard, and in light dishing of the starboard shell plating.

SECRET

USS STACK (DD406)

S. Miscellaneous.

(a) Paint.

It was observed that the darker shades of paint did not seem to have been flash burned to the same extent as light shades. In addition, dark paints, applied over aluminum priming coats, did not blister to the same extent as they did over other primers.

SECRET

USS STACK (DD406)

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TECHNICAL INSPECTION REPORT

SECTION II - MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No comment.

(b) Structural damage.

A few seams were opened in the outer casing of the breeching between stack and uptakes, above the main deck. This does not impair operation.

(c) Other damage.

About 50% of the lagging was torn off the steam supply line to the whistle and siren, above the main deck. This does not impair operation. There is no other damage to machinery.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Paint on exposed machinery was scorched and blistered.

(b) Fires and explosions.

No evidence.

(c) Shock.

No evidence.

SECRET

USS STACK (DD406)

(d) Pressure.

Blast pressure opened a few seams in the outer casing of the uptake breeching, and tore off part of the lagging on the steam line to the whistle and siren. The blast came from starboard.

(e) Effects apparently peculiar to the atom bomb.

Blast pressure slight enough to have noticeable effect at such a distance from an explosion is apparently peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on machinery and ship control.

None. The ship changed berths under her own power after Test A, at which time all machinery was operated, and functioned normally.

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on water-tight integrity and stability.

No comment.

(d) Effect on personnel and habitability.

None below decks.

(e) Total effect on fighting efficiency.

None.

SECRET

USS STACK (DD406)

IV. General Summary.

The STACK was outside the effective range of the explosion in Test A.

V. Preliminary Recommendation.

None.

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USS STACK (DD406)

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DETAILED DESCRIPTION OF MACHINERY DAMAGE

A. General Description of Machinery Damage.

(a) Overall condition.

A few seams were opened in the outer casing of the breeching between uptakes and stack above main deck. About 50% of the lagging was torn off the whistle line. This does not affect operation. There is no other change in the overall condition of the machinery.

(b) Areas of major damage.

None.

(c) Primary cause of damage in each area of major damage.

Blast pressure was the cause of the damage.

(d) Effect of target test on overall operation of machinery plant.

The Target Test had no effect on the overall operation of the machinery plant.

B. Boilers.

The boilers are undamaged. They have been steamed since Test A, and function normally. Hydrostatic tests indicate no change in their tightness. The uptake breeching from #1 fireroom between the stack and top of uptakes was crushed in slightly on the starboard side, opening a few seams which can be easily repaired by the ship's force and which will not impair normal operation of the boilers. (See photos 2170-5, 7, 10; pages 58, 59, and 62.)

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USS STACK (DD406)

HYDROSTATIC TEST DATA BOILER #3

	Before Test A	After Test A
Initial pressure	540 lb/sq. in.	600 lb/sq. in.
Time required for pressure to drop		
100 lb/sq. in.	1-3/4 hours	1-1/2 hours
200 lb/sq. in.	5 hours	3-1/2 hours
Pressure remaining after		
24 hours	98 lb/sq. in.	260 lb/sq. in.

C. Blowers.

Undamaged. All blowers were tested at normal steaming load after Test A, and found satisfactory.

D. Fuel Oil Equipment.

Undamaged. All fuel oil equipment was operated when the boilers were steamed after Test A. Operation was normal in all respects.

E. Boiler Feedwater Equipment.

Undamaged. All equipment was operated incident to operation of the boilers after Test A and found satisfactory.

F. Main Propulsion Machinery.

Undamaged. Both plants were operated incident to changing anchorage, both ahead and astern, after Test A. Operation was normal in all respects.

Leads left in bearings of the port low pressure turbine during Test A indicate vertical motion of the shaft of approximately .008 inch. This motion is attributed to whipping motion of the ship following the blast.

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BEARING LEAD DATA

PORT L. P. TURBINE - FORWARD BEARING

Forward lead	Before Test A	After Test A	Difference
Top	.014	.005	.009
After lead			
Top	.015	.006	.009

PORT L. P. TURBINE - AFTER BEARING

Forward lead			
Top	.0145	.005	.0095
After lead			
Top	.0135	.004	.0095

G. Reduction Gears.

Undamaged. Inspection while jacking over showed no damage. The gears were checked while the ship was underway after Test A, and functioned normally.

H. Shafting and Bearings.

Undamaged. Shafting and bearings were inspected while the ship was underway after Test A, and were found normal.

I. Lubrication System.

Undamaged. The lubrication system was inspected incident to operation of the main engines after Test A, and found satisfactory.

J. Condensers and Air Ejectors.

Undamaged. This equipment operated normally while the ship was underway after Test A.

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K. Pumps.

Undamaged. All pumps have been operated at normal working speeds and pressures since Test A.

L. Auxiliary Generators (Turbines and Gears).

Undamaged. Both turbo-generators have been operated under normal load since Test A.

M. Propellers.

Undamaged. The propellers were not inspected visually, however, they were checked while the ship was underway after Test A, and functioned normally.

N. Distilling Plant.

Undamaged. The distilling plant has been in operation since Test A, and is normal in all respects.

O. Refrigeration Plant.

Undamaged. The refrigeration plant has been in operation since Test A, and is normal.

P. Winches, Windlasses, and Capstans.

Undamaged. The anchor windlass operated normally under service conditions after Test A. The deck winch was operated satisfactorily at no load after Test A.

Q. Steering Engine.

Undamaged. The steering gear operated normally after Test A.

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R. Elevators, Ammunition Hoists, Etc..

Undamaged. The ammunition hoists have all been operated satisfactorily since Test A.

S. Ventilation (Machinery).

Undamaged. All ventilation machinery was operated after Test A. Performance was normal.

T. Compressed Air Plant.

Undamaged. Both air compressors have been operated normally since Test A.

U. Diesels (Generators and Boats).

Undamaged. The emergency diesel generator has been operated at normal load since Test A.

V. Piping Systems.

Undamaged. All systems were tested at rated pressure after Test A and found to be intact, and normal in all respects.

Lagging on the whistle and siren steam supply line and drain line was partially blown off. Operation was unimpaired.

W. Miscellaneous.

Undamaged. The laundry, galley, and machine shop equipment is normal in all respects.

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USS STACK (DD406)

TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No noticeable change in drafts or lists noted.

(b) Structural damage.

No structural damage to electrical equipment occurred.

(c) Other damage.

No damage to electrical machinery, ship control or fire control occurred.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Radiation came from about 45° relative. Slight damage was done to painted surfaces of exposed cable and searchlight train and elevation indicator dial glasses by scorching.

(b) Fires and explosions.

No fires or explosions occurred.

(c) Shock.

No damage by shock to electrical equipment occurred.

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(d) Pressure.

Slight electrical damage occurred as follows:

The special Code 660 material, PAE speaker amplifier box collapsed from external pressure.

(e) Any effects apparently peculiar to the atom bomb.

None other than radioactivity.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

No damage occurred.

(b) Effect on gunnery and fire control.

No damage occurred electrically.

(c) Effect on water-tight integrity and stability.

No effect occurred due to electrical equipment.

(d) Effect on personnel and habitability.

No effect occurred due to electrical equipment.

(e) Total effect on fighting efficiency.

No effect on fighting efficiency occurred due to electrical equipment.

IV. General Summary of Observers' Impressions and Conclusions.

This vessel, due to distance from the blast suffered no major damage and could have carried out its mission as a fighting ship.

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V. Any Preliminary General or Specific Recommendations of the
Inspecting Group.

None.

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DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

A. General Description of Electrical Damage.

(a) Overall condition.

The condition of the electric plant is essentially the same as before Test A.

(b) Areas of major damage.

No damage occurred.

(c) Primary causes of damage in each area of major damage.

None.

(d) Effect of target test on overall operation of electric plant.

No effect occurred.

(e) Types of equipment most affected.

Special Code 660 material, PAE speaker amplifier box.

B. Electric Propulsion Rotating Equipment.

Not Applicable.

C. Electric Propulsion Control Equipment.

Not Applicable.

D. Generators - Ships Service.

No damage.

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E. Generators - Emergency.

No damage.

F. Switchboards, Distribution and Transfer Panels.

No damage.

G. Wiring, Wiring Equipment and Wireways.

No damage.

H. Transformers.

No damage.

I. Submarine Propelling Batteries.

Not Applicable.

J. Portable Batteries.

No damage.

K. Motors, Motor Generator Sets and Motor Controllers.

No damage.

L. Lighting Equipment.

Fighting light on formast starboard broken.
Blinker lights on formast tilted backward due to twisted yardarm,
other than that no damage.

M. Searchlights.

No damage occurred other than scorched elevation
and train indicator dial glasses and paint.

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N. Degaussing Equipment.

No damage.

O. Gyro Compass Equipment.

No damage.

P. Sound Powered Telephones.

No damage.

Q. Ship's Service Telephones.

Not Applicable.

R. Announcing Systems.

No damage.

S. Telegraphs.

No damage.

T. Indicating Systems.

No damage.

U. I.C. and A.C.O. Switchboards.

No damage.

V. F.C. Switchboards.

No damage.

W. Special Code 660 Material.

No damage other than noted below:

1. Exposed cable around pilot house was slightly scorched.

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2. PAE speaker amplifier case is dented due to exterior pressure.

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SECTION IV

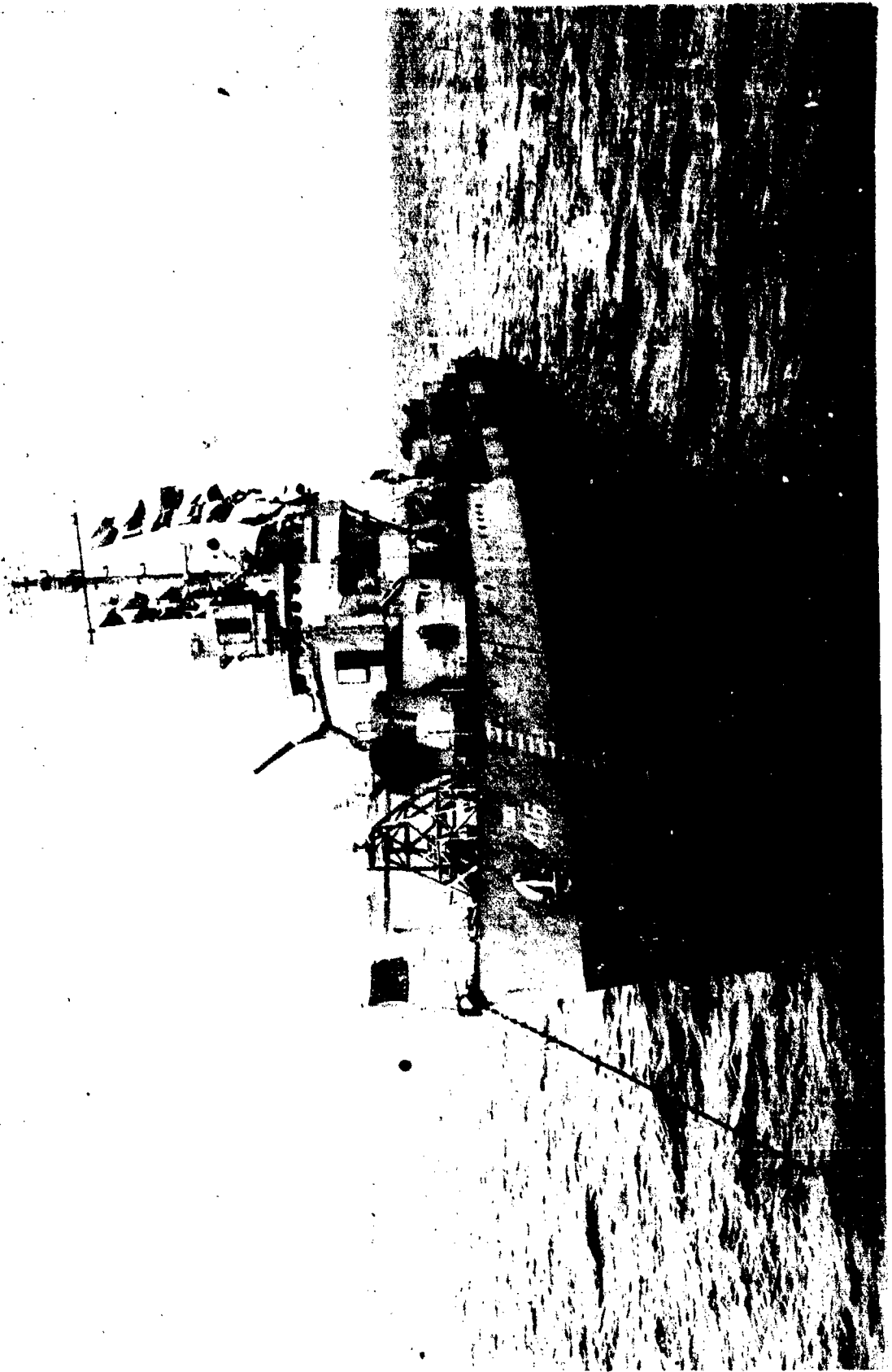
PHOTOGRAPHS

TEST ABLE

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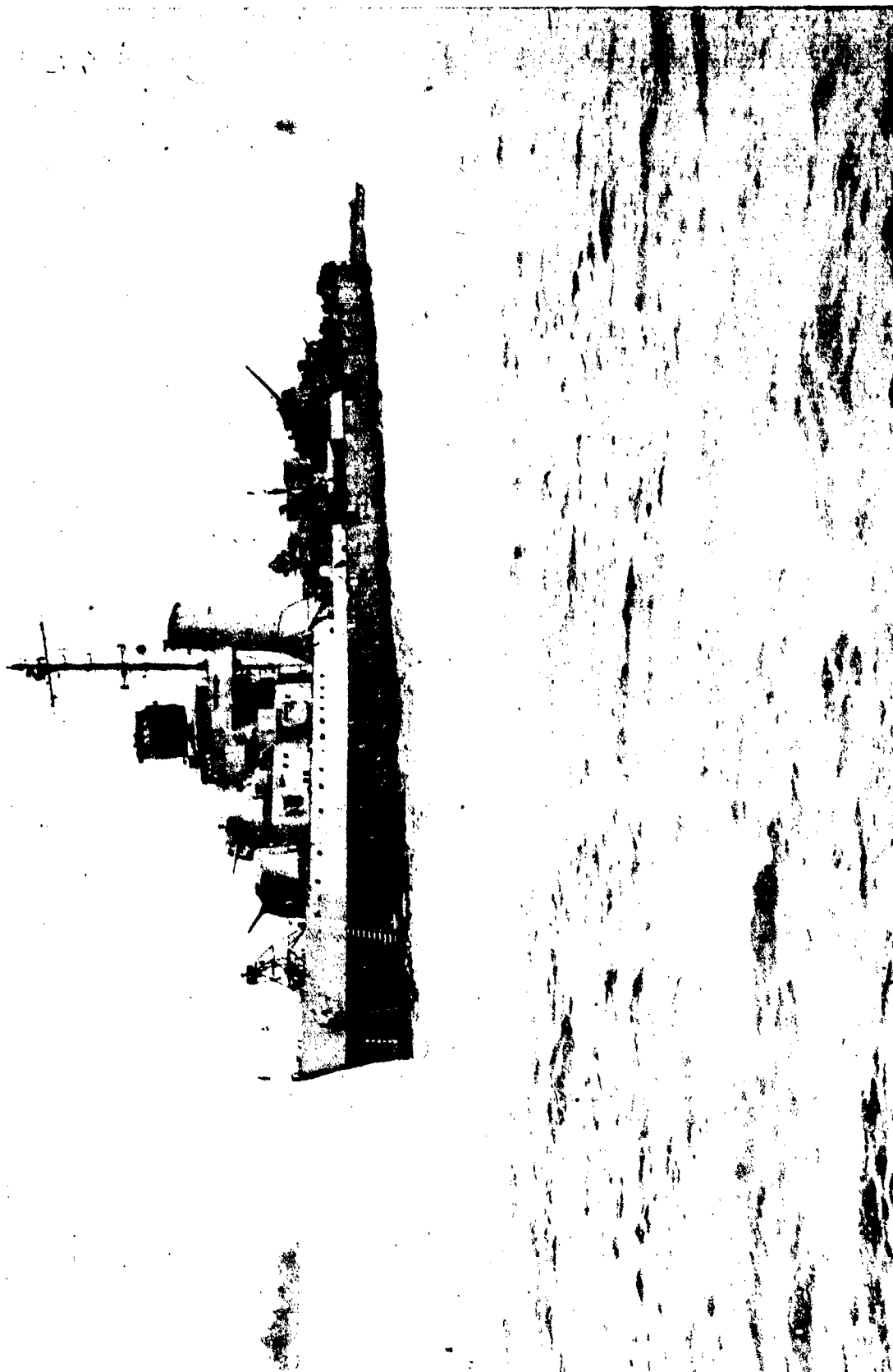
BA-CR-82-1549-5. View from off the port bow before Test A.

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AA-CR-227-49-144. View from off port bow after Test A.

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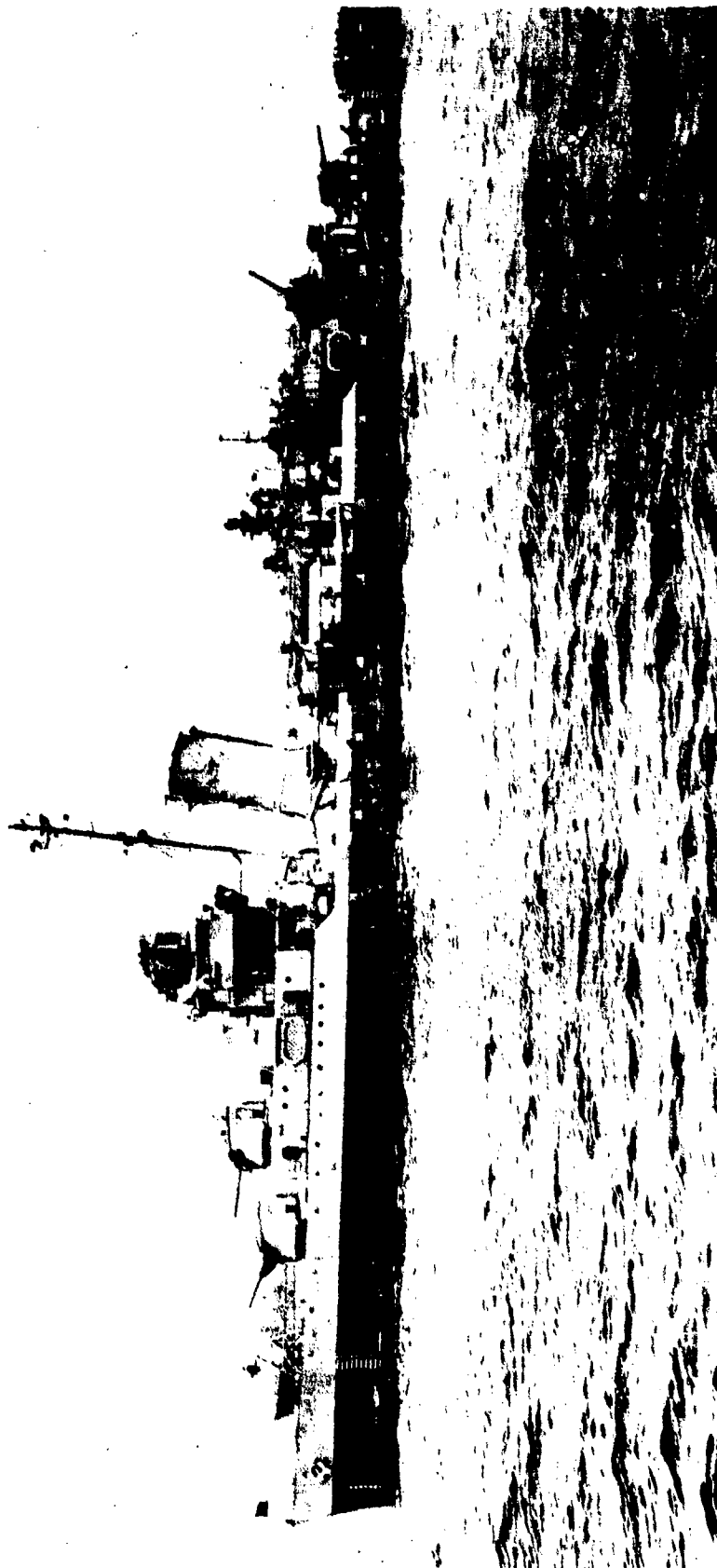
BA-CR-62-1533-5. View from off port beam before Test A.

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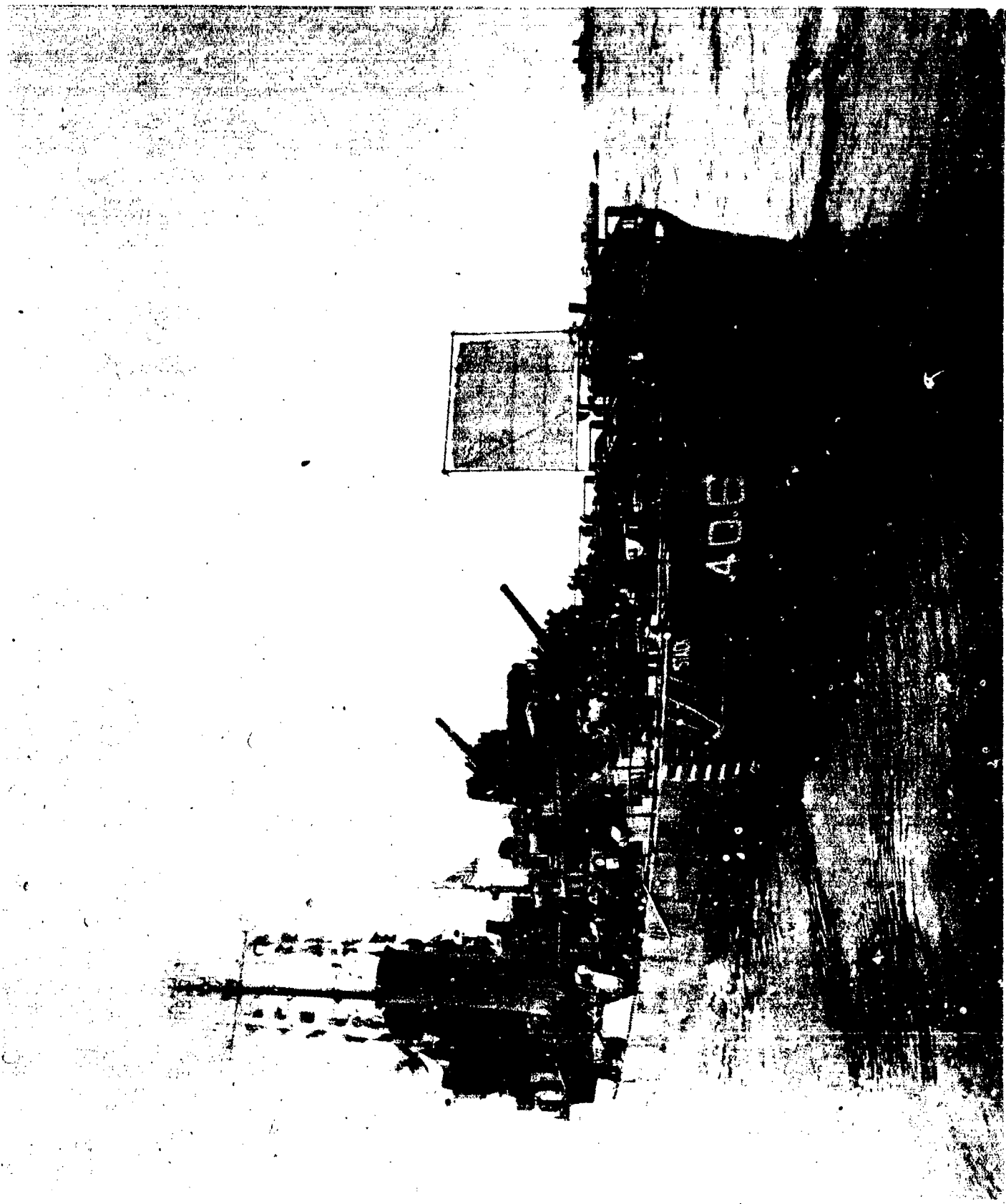
AA-CR-227-49-145. View from off port beam after Test A.

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BA-CR-82-1549-7. View from off port stern before Test A.

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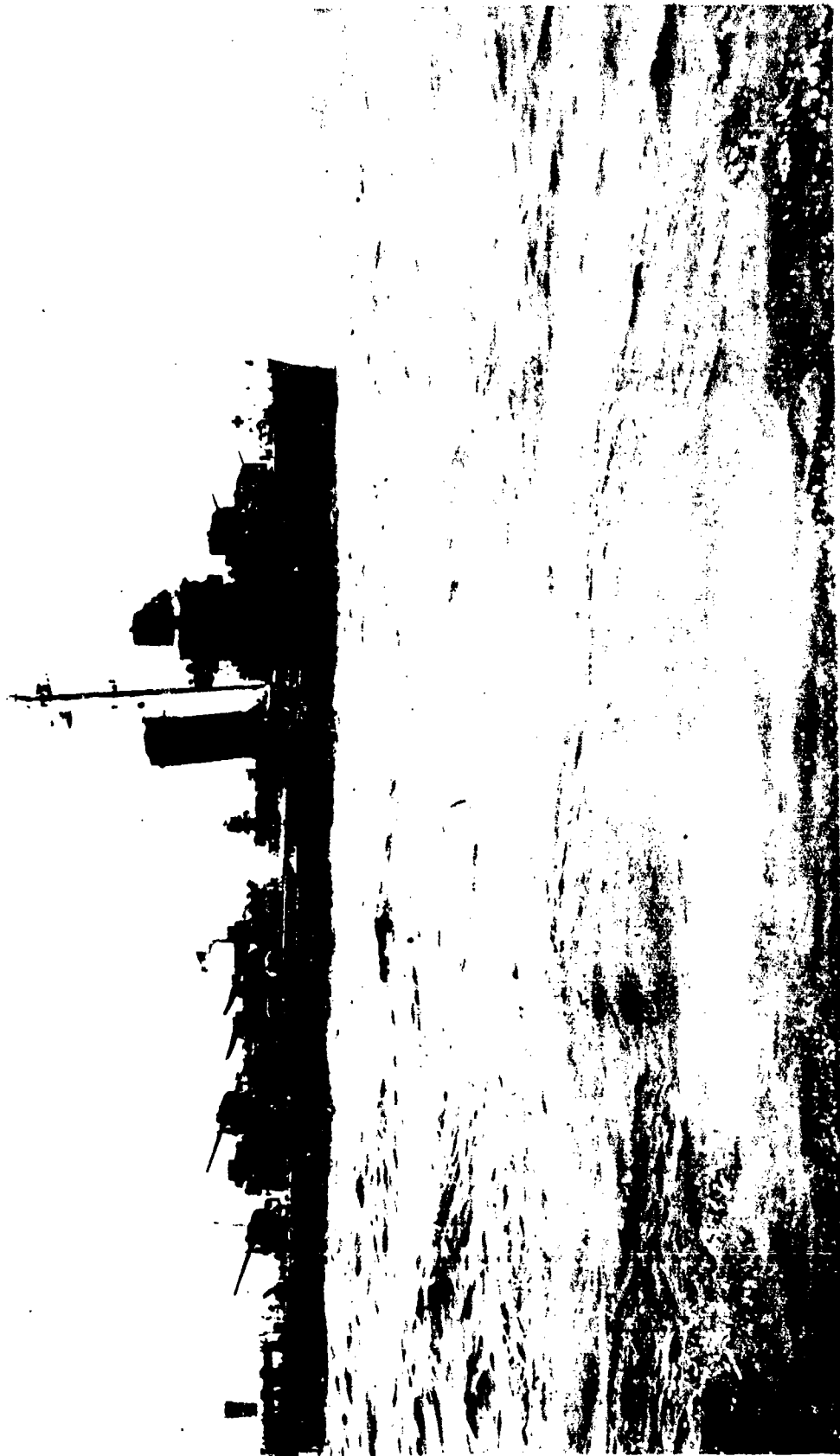
AA-CR-227-49-141. View from off port quarter after Test A.

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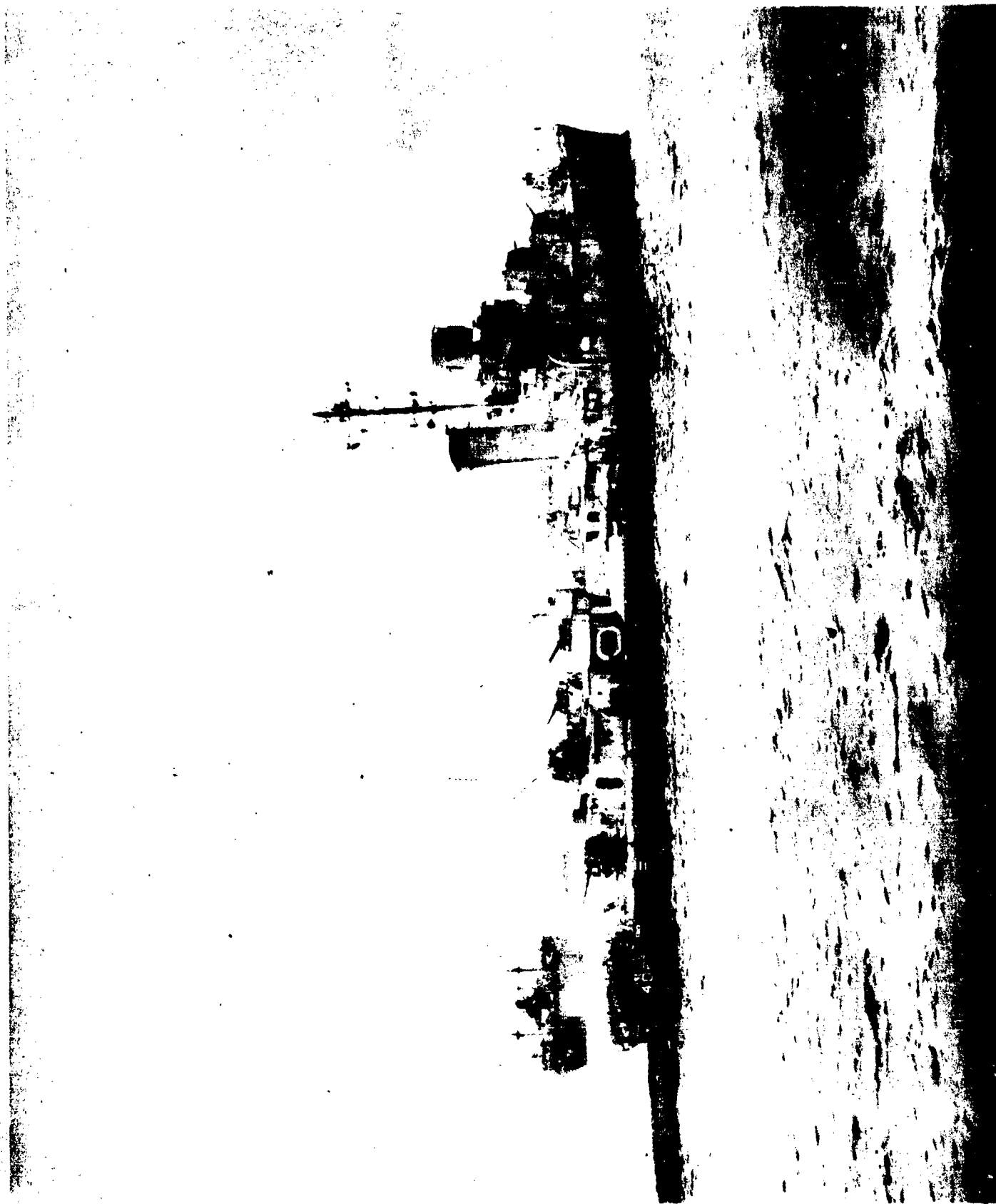
BA-CR-62-1533-4. View from off starboard quarter before Test A.

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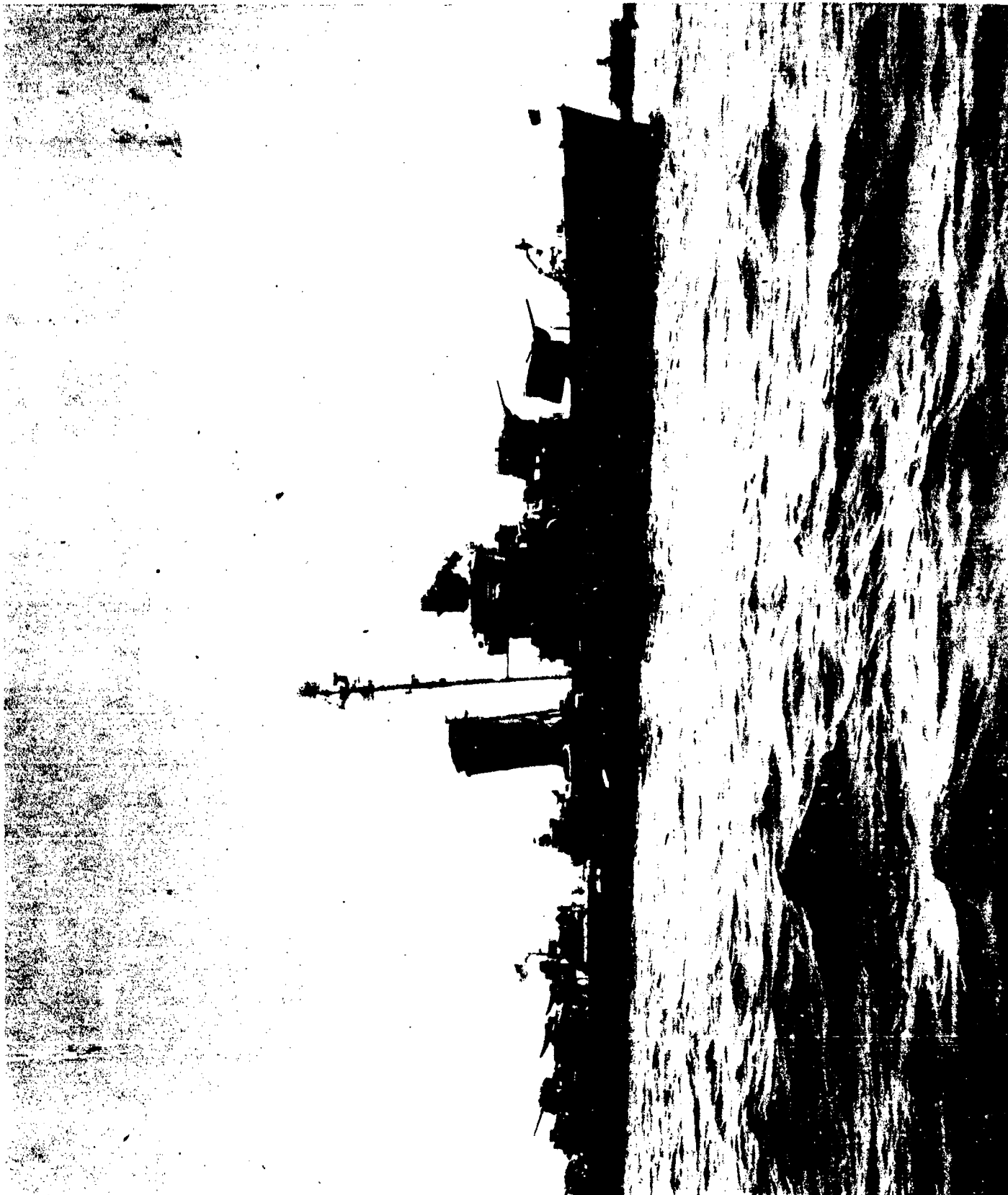
AA-CR-227-49-148. View from off starboard quarter after Test A.

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BA-CR-62-1533-3. View from off starboard beam before Test A.

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AA-CR-227-49-146. View from off starboard beam after Test A.

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AA-CR-58-2006-12. Looking up and aft from superstructure deck showing forward face of pilot house and damage to Mark 51 director bulwark.

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AA-CR-58-2006-8. Looking aft on main deck, starboard, showing distortion of 20 MM gun bulwark at frame 100 and dishing of bulkhead and door in way of Engineer's Log Room.

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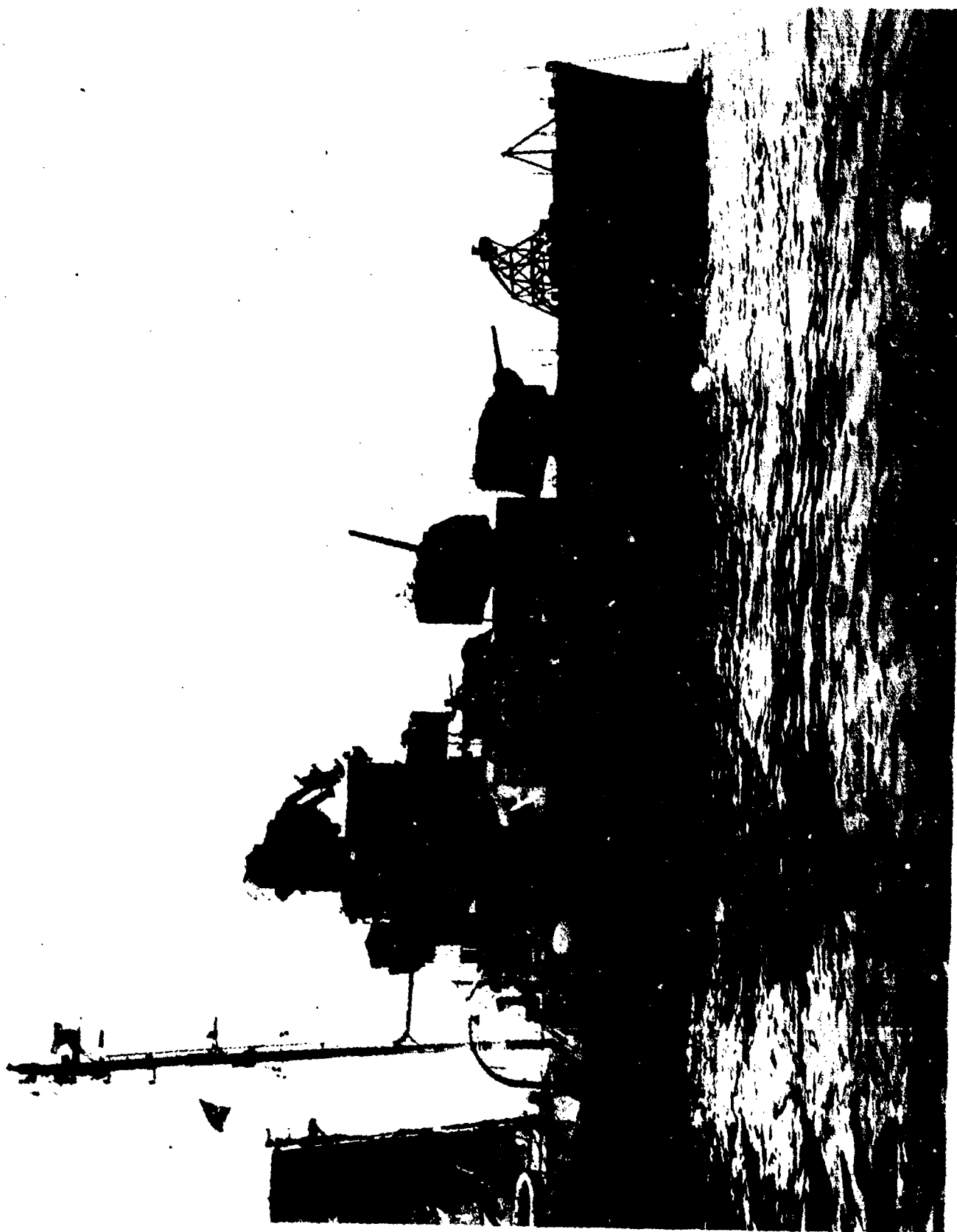
AA-CR-65-1850-5. Close-up of distortion of starboard 20MM gun enclosure at frame 100 looking aft and up from main deck.

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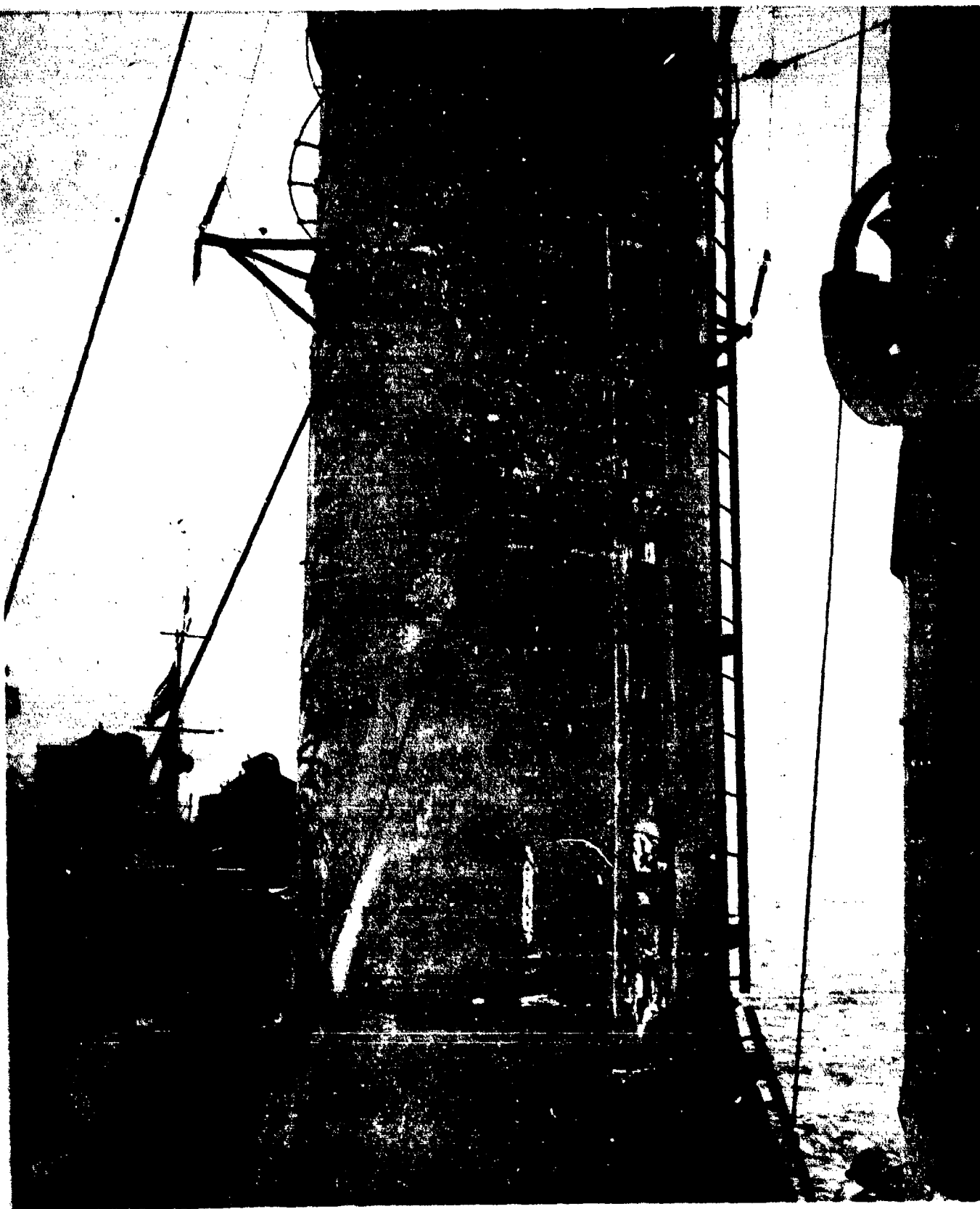
AA-CR-92-1772-8. View from off starboard bow, stem to stack.
Note damage to stack.

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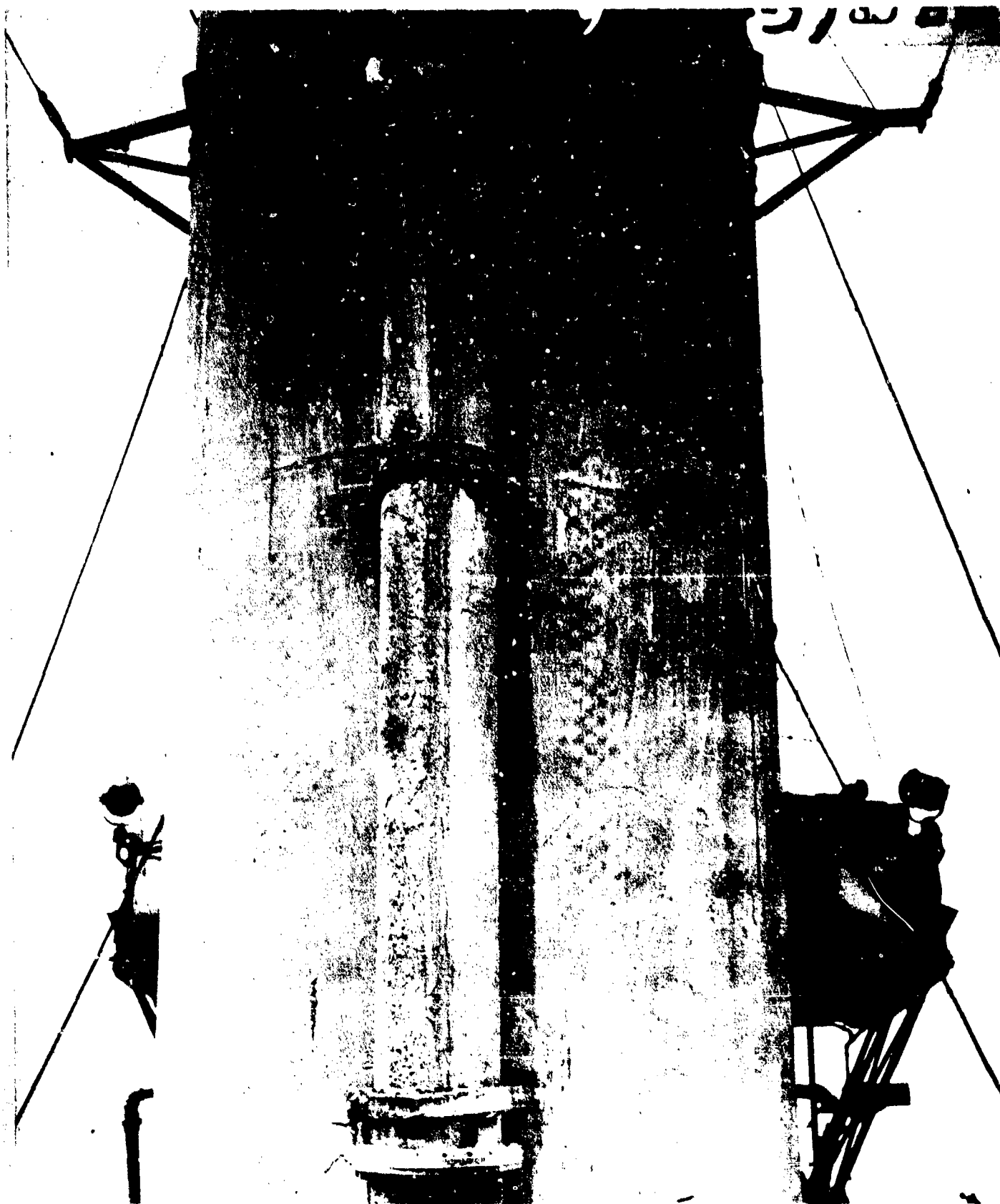
AA-CR-58-2006-10. Looking aft from superstructure showing paint damage on stack and lagging stripped from whistle drain line.

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AA-CR-65-1850-6. Looking forward towards stack showing paint damage. Note distorted starboard flag bag.

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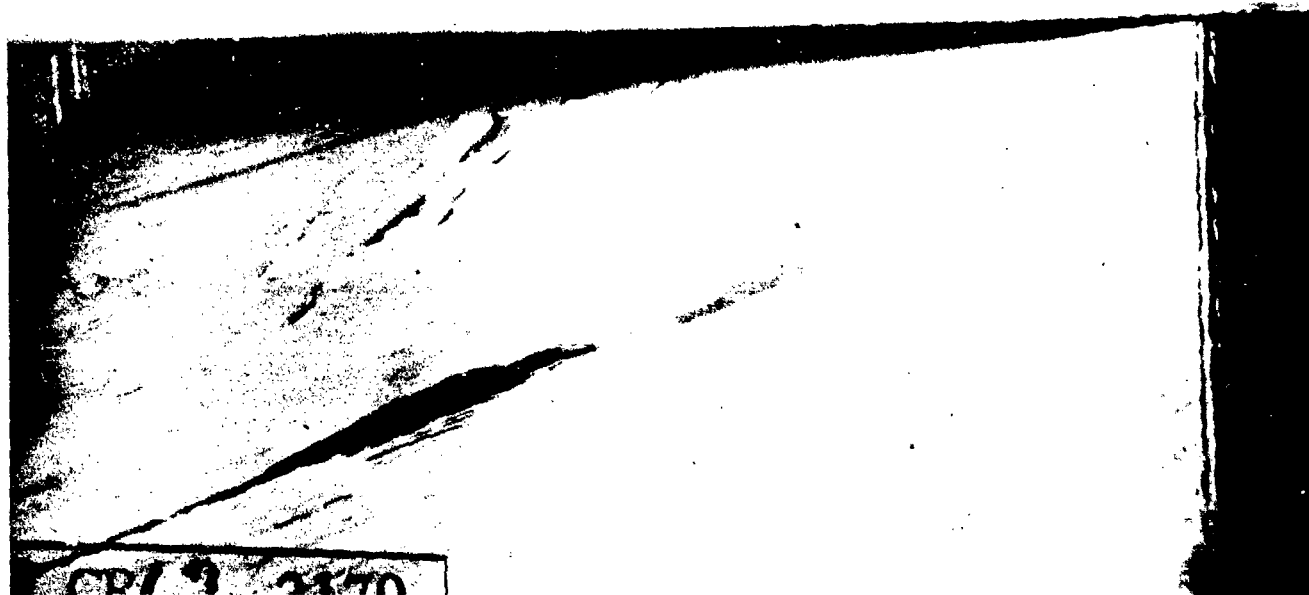
AA-CR-58-2006-7. Looking forward and to port on main deck showing damage to starboard side of No. 1 uptake breeching. Note damage to pipe lagging.

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AA-CR-62-2170-5. Looking forward and to port on main deck showing damage to starboard side of No. 1 uptake breeching.

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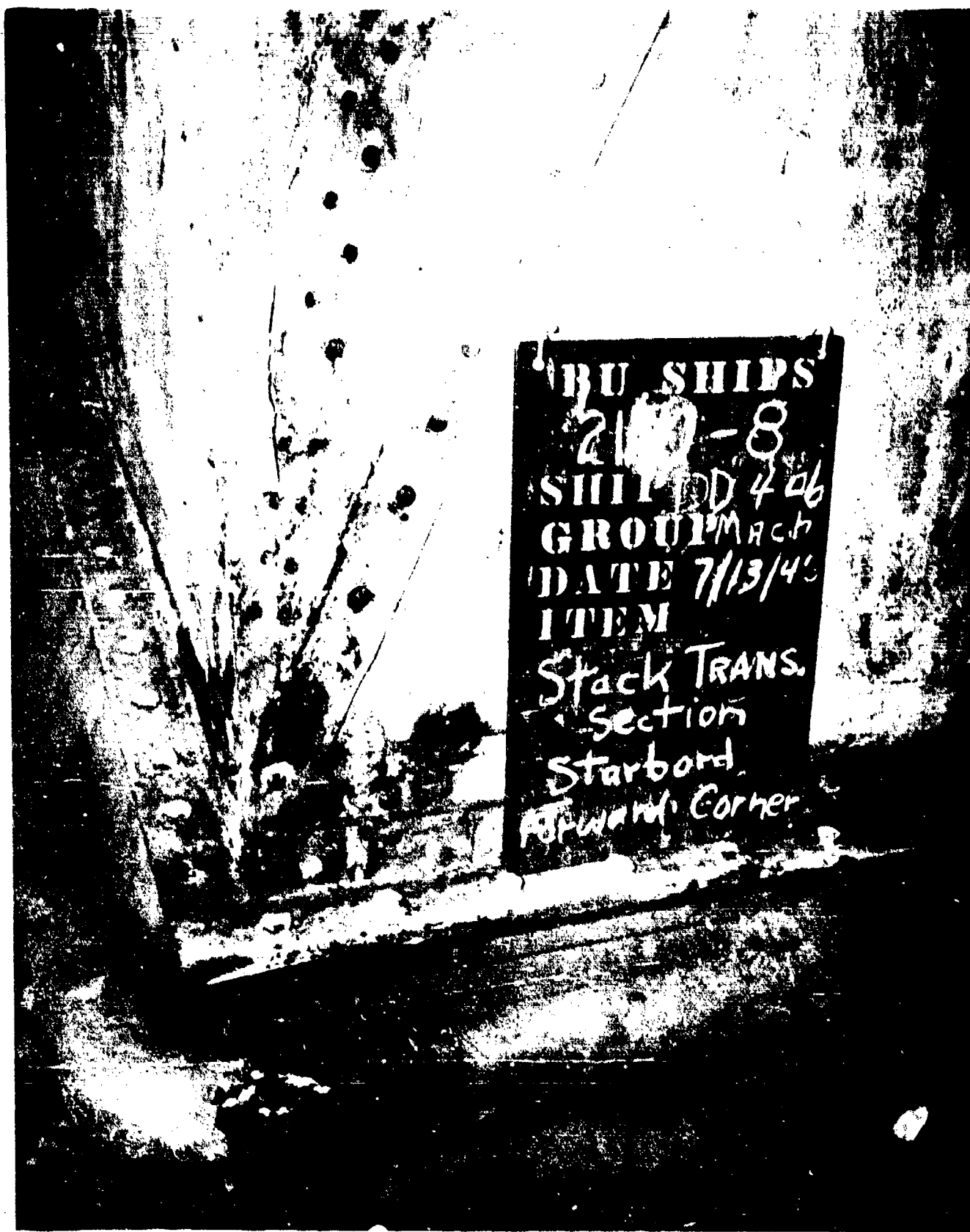
AA-CR-62-2170-7. Looking inboard at starboard side of No. 1 uptake showing torn plating.

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AA-CR-62-2170-8. Cracks near starboard forward corner of transtion section between uptakes and stack.

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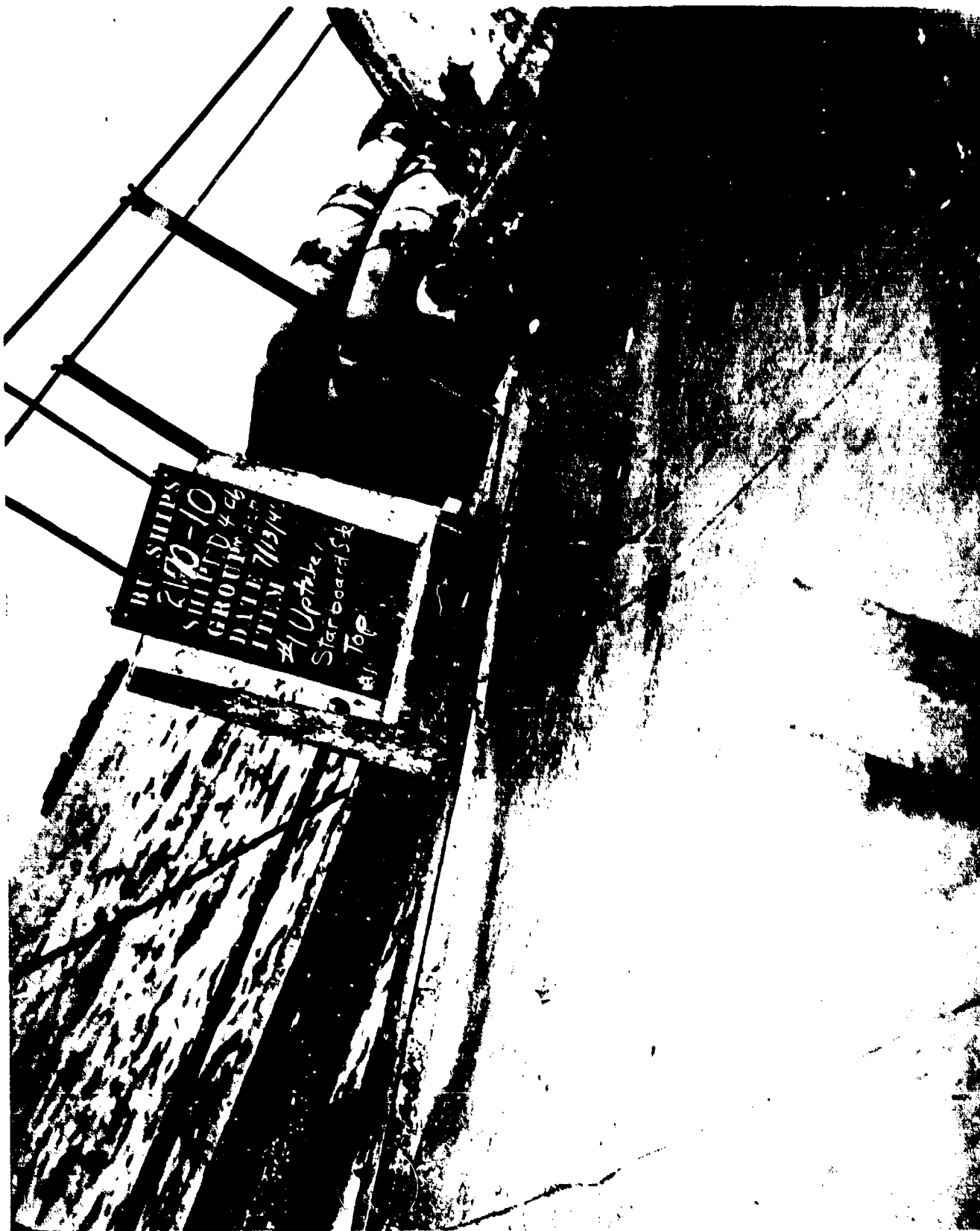
AA-CR-62-2170-9. Paint damage on starboard side of stack in way of transition section between stack and uptake.

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AA-CR-62-2170-10. Looking aft and to starboard showing tear at starboard edge of top of No. 1 uptake.

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AA-CR-58-2006-11. Looking aft on starboard side of superstructure deck showing dishing of bulkhead and door in way of C.I.C. room. Note seam failure just forward of door frame.

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AA-CR-58-2006-5. Looking aft on forecastle deck, starboard, showing dishing of bulkhead and door to radio room.

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AA-CR-65-1850-7. Close-up of damage to door to Engineer's Office, frame 100, starboard, looking forward.

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AA-CR-65-1850-8. Close-up of damage to bulkhead and door to Engineer's Log Room, main deck, starboard, looking aft.

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AA-CR-58-2006-9. Looking forward and to starboard on main deck showing dishing of door to damage control locker, frame 123, port.

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AA-CR-92-1772-7. View from off starboard beam, stack to stern.
Note twisted yardarm on foremast.

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AA-CR-58-2006-6. Looking up and forward to damaged starboard flag bag.

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APPENDIX

SHIP MEASUREMENT DATA

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DECK DEFLECTION GAGES

TEST A

SHIP U.S.S. STACK (DD-406)

LOCATION		DIST. OFF &	MAXIMUM COMP.	MAXIMUM EXP.	PERMANENT		SET EXP./COMP.	REMARKS
FR. NO.	DECK				DISTANCE	EXP.		
19	MAIN	CENTERLINE	NONE	NONE	NONE	NONE	NONE	NONE
37	"	"	"	"	"	"	"	"
36 1/2	2ND	PORT	"	"	"	"	"	"
148 1/2	"	CENTERLINE	"	"	"	"	"	"
171	"	STBD.	0-0-5/16	"	"	"	"	"
171	"	PORT	0-0-11/16	"	"	"	"	"

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APPENDIX

COMMANDING OFFICERS REPORT

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REPORT #11

COMMANDING OFFICERS REPORT

SECTION I

Name of ship:	U.S.S. STACK
Type of ship:	Destroyer - 1500 tons
Number-Class:	DD 406 - Mahan Class
Position:	Berth 128, bearing 324°T from center of berth 161, distance 1635 yards.

At the time of the test, the STACK was in condition able with 100% fuel and ammunition allowance on board. The ship was completely evacuated of personnel, and all equipment, both electrical and mechanical, was secured. Both anchors were down, with 45 fathoms of chain to the port anchor, and 105 fathoms of chain to the starboard anchor.

The two (2) torpedo mounts were each fitted with four (4) 21" Mk. 15 Mod. 1 torpedoes in condition 5 able. Each of the eight (8) 20MM AA ready boxes contained 180 rounds of HEI or HET ammunition. No. 1 and No. 2 5"/38 mounts had a full allowance of Mk. 35 VT projectiles in the ready racks. Twenty-two (22) Mk. 9 D.C.'s were in the racks and sixteen (16) Mk. 9 D.C.'s were on the K guns and in the roller loaders. D.C.'s were fitted with pistols only, (safety forks and caps were attached and safety bars were in place in the racks). The impulse charges, including twenty-five (25) pounds of black powder, for K guns and torpedoes, were stowed topside in ready boxes. Partial allowance of pyrotechnics was also stowed topside. The rest of the ammunition allowance was stowed in the magazines or handling rooms, below decks.

The ships small boat, floater nets, paints, alcohols, personnel and administrative gear, was removed from the ship prior to Able minus one day. All weather cloths, gun and directors covers, awnings, wooden stagings, damage control shores, manila lines, fenders, signal flags and cleaning gear was struck below. Miscellaneous blocks, pelican hooks, spare chain, shackles and other tackle was also removed from the topside, in an effort to reduce as much as possible, the expected hazards they might cause, as missiles in the event of explosion or

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USS STACK (DD406)

near miss. In this connection, the boom for the special anchor crane was unshipped and securely lashed to deck plates.

Boatswains gear was equally divided between the lockers forward, and compartment C-201-2-AL. In the event of serious damage, it was felt that this precaution was advisable. Hose lines with nozzles attached were made up on all hydrants; spanners and wrenches were secured in way thereof. Fire buckets, (with sand) were placed at various points around the topside and damage control lockers were completely provided with all necessary gear.

Exhaust and scavenger blower ducts were stenciled; air test corks were marked in red paint to aid initial boarding teams in quickly identifying them; ready boxes, handling and clipping room, gun shield and magazine hatches and doors were stenciled. G.I. cans were painted and suitably stenciled, located topside, (amidships), to take spent rescue breather canisters.

Books, stationery, office supplies, correspondence files, periodicals, cleaning rags, spare mattresses and other inflammable articles, were removed from the ship before Queen minus one day. All compartments were thoroughly cleaned and inspected again before disembarking on A minus one day, and dry stores and balance of provisions on board transferred to the evacuation transport.

It is felt that, despite the general precautions taken, that without power or personnel on board at the time of the test, the ship could not materially assist in resisting damage caused by serious fires or explosions.

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SECTION II

1. Major damage consisted of the following:

- (a) SC radar antenna sheared off foremast truck and missing.
- (b) Foremast starboard headstay tang at truck sheared off, (shroud undamaged and replaced after providing new tang.)
- (c) Mk. 33 director shield doors, door frames, hatches, and hatch combings dished and otherwise severely damaged. Two dipoles on Mk. 4FD radar antenna broken. (have been replaced) Window on rangefinder operator station, port side, shattered. Stable element jarred out of gimble forks. (Has been reset.) Power fuses in panel, located in Pilot House, jarred out of clips, Mk. 33 director mount appeared loose on its foundation at time of reboarding, however, it operated normally when later tested out.

2. Minor damage consisted of the following:

(A) Pilot House Level:

- (a) Six 15" glass ports in pilot house blown through retaining rings; one glass port shattered.
- (b) Bulkhead, door and door frame for emergency cabin and Torpedo Tracking Station A-0303CL dished in. Faces aft.
- (c) Flag bag retaining clips sheared off. Port flag bag severely dished in. Starboard flag bag slightly dished in. Both bags are of light sheet metal, and both sections, dished in, faced forward. Canvas for both covers split.
- (d) Both degaussing cables, port and starboard, burnt, and sections removed after test by DMS personnel.

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USS STACK (DD406)

- (e) Signal bridge desk dished and rivets sheared off.
- (f) Port and starboard gyro repeater covers blown off and missing
- (g) Bridge seat starboard side, bottom blown out.
- (h) Windshield wipers for ports in pilot house burnt and bent out of shape.
- (i) Yard, on foremast, twisted around approximately ten degrees.
- (j) Two of the three recognition light globes shattered on starboard side of foremast.
- (k) Anchor ball burned necessitating recovering frame with new canvas.
- (l) Flag halyards, starboard side burned down. Flag halyards port side scorched but in place.
- (m) Ladder from pilot house level starboard side, leading below to CIC level, blown up against underside of bridge wing and twisted out of shape.
- (n) Radio antenna from after ends of pilot house to stack, down.
- (o) Loran gear antenna inside of chart house, broken from insulator.
- (p) Overhead fuse box, inside pilot house, jarred loose.
- (q) Glass over truck light indicator in pilot house shattered.
- (r) Recognition light switch box and control panel dished and two switch buttons broken by flying glass.

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USS SLACK (DD406)

(s) Mike NAN phone holder broken.

(t) Paint on forward and starboard sides of Pilot House and Bridge wings scorched and blistered.

(u) Hasp for safety cover over K gun contact makers, starboard side shattered.

(B) C.I.C. Level.

(a) Door and door frame to radar transmitter room, A-0203L, starboard side dished in. Black out switch broken.

(b) Door and door frame to C.I.C., starboard side, dished in, bulkhead forward of same, dished in and rivets sheared off at butt in plating. Three stiffeners inside fractured just forward of door frame (stb'd. side). Compartment door and bulkhead not W.T.

(c) Forward center line 51 director mount tub dished in (stb'd. side).

(d) Forward starboard 20MM AA gun tub slightly dished between stiffeners.

(e) No. 2-5"/38 gun shield slightly dished in starboard side.

(f) No. 2-5"/38 gun bloomer ripped to shreds.

(g) No. 2-5"/38 gun shield hatch, starboard side, blown off.

(h) Heater in No. 2-5"/38 gun shield blown off starboard bulkhead.

(i) No. 2-5"/38 gun (right hand) trainers handwheel blown off.

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USS STACK (DD406)

(j) No. 2-5"/38 gun shield rack broken and VT fuse cap on the projectile stowed therein, blown off.

(k) Small gear locker, starboard side, dished in and fastenings loosened.

(l) Rivets in air vents starboard side, sheared off.

(m) Paint on forward and starboard sides of No. 2-5"/38 gun shield, 20MM AA gun tub, and superstructure house, charred and blistered.

(C) Raised deck (forecastle) level.

(a) No. 1-5"/38 gun shield slightly dished in.

(b) No. 1-5"/38 gun bloomer ripped in two places port side of chase.

(c) Hose lines in racks, forward side of superstructure house, aft of No. 1-5"/38 gun shield, flash burned.

(d) Bulkhead, door and door frame to ammunition handling room A-0101M starboard side, dished in.

(e) Door and door frames to passage A-0103L, and outside bulkhead forward of same, starboard side, dished in.

(f) Bulkhead, door and door frame to Radio Central A-0104C, starboard side dished in. Spare parts locker, inside in way of door, dished in by dog handle of door. The dog handle is distant from locker sheathing approximately three inches indicating bulkhead was pulled out again by vacuum after first having been blown in by explosion. Stiffener inside, just aft of door frame, dished in. Door not W.T.

(g) Paint forward and starboard sides of No. 1-5"/38 gun shield and superstructure house, charred and blistered. Waterways, or covering plates, on forecastle deck starboard side, blistered down two coats.

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USS STACK (DD406)

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(D) Stack and aft of forecastle deck level.

- (a) Stack slightly dished, upper starboard side.
- (b) Smoke guard slightly dished.
- (c) Lagging blown off steam line to whistle and siren.
Both whistle and siren bent slightly aft by blast.
- (d) Stack scupper pipe line severed at elbow, (starboard side).
- (e) Horizontal, and vertical surface starboard side of uptake casings for Nos. 1 and 2 boilers, dished in.
- (f) Horizontal and vertical surface, starboard side, of uptake casing for No. 3 boiler, slightly dished.
- (g) Amidships starboard 20MM AA gun tub dished in between forward outboard stiffeners.
- (h) Search light mount blistered and charred forward side.
- (i) Main mast and truck halyards scorched and charred.
- (j) 51 director tubs, for after twin 40MM guns scorched and blistered forward side.
- (k) After side of No. 3-5"/38 gun blistered and charred. Gas ejection gauge glass shattered. Rammer motor switch cover blown open. Phone box cover bent and otherwise damaged.
- (l) Paint on after starboard 40MM gun tub charred and blistered.

(E) Main deck level.

- (a) No. 4-5"/38 gun rammer oil tank filling cap and float blown off and missing.

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USS STACK (DD406)

(b) Door and door frame to crews head, frame 140, starboard side, slightly dished in.

(c) Bulkhead, door and door frame to Torpedo Work Shop, frame 120, starboard side dished in (faces quartering aft).

(d) Bulkhead, door and door frame to Rain Clothes Deck gear locker 13-105-A dished in.

(e) Bulkhead, door and door frame to Engineers Log Room, frame 100, starboard side, dished in.

(f) Vent duct guard, frame 88, starboard side, facing forward, dished in.

(g) Bulkhead, door and door frame to deck gear locker (pressing room) B-101-A, starboard side, dished in. Bulkhead broken away from vent duct casing just forward of door.

(h) Mail box door, starboard side, in way of door to passage A-205L, broken.

(i) Door and door frame to passage A-205L dished in. (faces aft).

(j) Door and door frame to general workshop B-104-E, port side, dished in.

(k) Bulkhead, door and door frame to damage control locker, port side amidships, dished in. Door not W.T. (faces quartering aft).

(l) Bulkhead, door and door frame to ammunition handling room, C-102ML, port side, slightly dished in. (faces quartering aft.)

(m) Superstructure houses, and topsides of ship from deck level down to water line, forward and aft, starboard side, flash burned.

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(F) Below decks.

(a) Vent duct casing, inboard in way of door frame 56, in wardroom blown away from bulkhead up against wardroom table.

(b) At frame 37 port side a slight dishing in was noted.

(c) All compartments below decks were covered with fine dust presumed to have been shaken loose from overhead wiring, sheathing and vent ducts.

(G) Radio and communications.

(a) SC radar inoperative due to loss of antenna.

(b) SG radar operating normally.

(c) TBL filters torn loose and antenna broken at time of reboarding, now repaired and operating satisfactorily.

(d) TCS5 case caved in and tubes broken at time of reboarding is repaired and operating satisfactorily.

(e) M.A.N. antenna down at time of reboarding, set now operating satisfactorily.

(f) TBS motor generator circuit open, starting relay torn from shock unit, and antenna down at time of reboarding, now operating satisfactorily.

(H) Machinery and electrical.

(a) No damage sustained.

(I) Ordnance.

(a) One round of 5"/38 VT was jettisoned as a result of damage to fuse cap when jarred from the ready rack in No. 2-5"/38 gun shield.

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(b) Two rounds of 20MM HEI was jettisoned from the starboard amidships 20MM AA ready box as a result of damage to fuse ends.

(c) Maximum temperatures registered in 20MM AA ready boxes was 119°F.

(d) Temperatures in magazines was normal.

2. It is believed that all personnel, exposed outside the ship topside, as well as personnel in the main director and possibly CIC, would have been killed by the blast. Personnel in the forward 5"/38 gun shields, pilot house and radio shack would possibly have been badly injured. Personnel below the raised deck or forecastle deck level, would have been uninjured. The ship would therefore have been able to steam normally, and a number of the guns could have been remanned and fired in local control. Repairs to communications would have been accomplished quickly and radars with the exception of SC, would have been functioning normally in short order.

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SECTION III

1. The structural effects of Target Test A, on the STACK was not of an apparent serious nature. The major damage was slight, and would have resulted in restricting the ship from the use of air search radar and director fire control only. The effect on personnel would have been of a more serious nature as it is believed that all exposed personnel topside as well as director and possibly CIC personnel, would have been killed at the moment of the blast or within a moment thereafter, from the effects of the blast. Personnel below decks would not have been injured except in the event that flare backs occurred in the fire rooms. There were no indications, however, that this casualty would have resulted from the blast.

2. There were no special materials that would have added to the dangers normally arising from fires, explosions or flooding on board this vessel.

3. Due to the absence of personnel, and with all mechanical and electrical power secured at the time of the blast, fires, explosions or flooding could not have been controlled.

4. From observations of damage sustained to the STACK, and other vessels in the target array, approximately the same distance from the blast that the STACK was anchored, the following recommendations for changes in design and arrangement are respectfully submitted.

(a) Riveting to be eliminated entirely in the construction of Destroyers.

(b) Hull and superstructure houses carry pronounced tumble-home. Square or flat surfaces be entirely eliminated.

(c) Framing be diagonal on web frames.

(d) Stack be "built in" and integral part of superstructure house. Steam lines, atmospheric exhausts, whistles and sirens be countersunk or faired into stack casings.

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(e) All light AA machine guns be installed in "blisters" of transparent, bullet, fire and flash proof plastic materials (similar to aircraft mountings) sliding hatches of the same material could be provided to open to the weather.

(f) Gun shields and director mounts be rounded and faired into the superstructure houses. Escape hatches to handling rooms below be increased in size to eliminate as much as possible, exposing personnel on weather decks.

(g) Opening ports in superstructure houses, including pilot houses, to be eliminated entirely. Casualties caused by flying glass, non shatterable ports blown clear of retaining rings, battle ports and dog wrenches insecurely mounted could be entirely eliminated.

(h) Bridge and signal bridge wings and venturie screens could be eliminated to reduce blast effect and resultant damage and injury to personnel. Conning stations over steering stations could be inclosed in "blisters" of transparent bullet, flash, and fire proof plastic materials. These "blisters" could be fitted with sliding hatches of the same materials to open them to the weather.

(i) Faired and windaged air duct openings outside could be fitted with screens for absorbing radio active particles.

(j) Masts, which are presumed to be necessary for carrying radio and radar antennas, should be constructed of "built up" welded sections with all fittings and cables carried inside the spar. Standing rigging, reduced to a minimum, could be of stainless steel rod. The present practice of providing 6 X 19 galv. wire for standing rigging is considered poor practice. Airplane strand is to be preferred. 6X19 has a rope heart and therefore "stretches" continuously. The rope heart compresses and expands as pressure is applied or reduced on it. In expanding and contracting the strands rub against each other thereby removing the galvanizing. This permits the cable to rust out quickly, and stranded wire might hold radio active materials in the lay indefinitely.

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(k) Great care in design and supervision should be exercised to see to it that terminal ends (sockets) fit over tangs properly to permit the correct lead to chainplates. The starboard headstay tang at the foretruck on the STACK carried away in the blast due to faulty supervision of this detail. (There are a number of terminal ends that still do not fit down properly over tangs at the foretruck).

(l) Yard arms might be eliminated entirely. Truck halyards could be of stainless steel wire run inside the mast over sheaves with the spliced manilla or hemp tails made up or terminating at inside signalmen's stations in the superstructure house or "blisters". If signal flags were eliminated from future allowance lists, the necessity for yards could be further reduced.

(m) Bloomers can be eliminated entirely from gun shields further reducing leaks and fire hazards.

(n) All "ready" ammunition in way of AA gun mounts could be stowed in the "blisters" the same as 40MM ammunition is now stowed in "tubs" outside.

(o) Boiler uptakes, if installed inside deck houses, would not be subjected to blast effects. Passageways, fore and aft in side the superstructure houses, would eliminate some of the dangers to personnel going to battle stations or about ship's work.

(p) To further reduce casualties to personnel caused by flying glass, all lighting through the ship might be indirectly lighted. Fans, extinguisher bottles, battle lanterns, etc etc., could be installed in receptacles let into bulkheads.

(q) Furniture such as chairs, medicine lockers with glass mirror fronts, book cases, key lockers, bureaus etc etc., could be entirely eliminated by "building in" transoms, lockers and other furniture in compartments. In this connection, officers bunks could be relocated against inboard bulkheads and the mattresses supported on pipe frames that could be "upped" to gain access to stowage space available beneath. This would eliminate "bunk boards", stowage

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for same, draws under which are a nuisance and restrict stowage, and permit sleep at night in heavy seas by permitting bunks to be lashed up against bulkheads. The above would further reduce the "missel" hazard under fire.

(r) Wash basins in officers staterooms might be relocated in officers heads. This arrangement might result in saving in topside weight and additional piping and fittings could be eliminated.

(s) Watertight doors and door frames might be further altered in design to provide additional strengthening to bulkheads. Most of the "dishing in" of doors and frames on board this vessel, was caused by increased spacing between stiffeners to allow room for "stock" doors and frames. There would be very little increase in weight. Dogs might be operated clear of the doors on the offside from door hinges to eliminate casualties to personnel opening doors to compartments under pressure or filled with explosive fumes.

(t) Outside ladders might be reduced to a minimum, if not entirely eliminated. Accesses to bridges should be inside superstructure houses, and ladder rungs welded in proper locations, outside, to assist in manning battle stations more rapidly, could be provided only where absolutely necessary.

(u) Stowage bins and lockers, with adjustable shock proof doors and clips, should be provided away in excess of estimated requirements for spare parts in all compartments containing radio, radar or other navigational, mechanical or electrical units. It is appreciated that this is one of the most difficult problems confronting naval constructors but its importance recommends further serious effort to solve the dilemma. At present, in most destroyers, spare parts are indiscriminately stowed throughout compartments in inflammable containers. The manner in which they must necessarily be stowed, is a danger to personnel and vital pieces of equipment in case of fires or explosions. In this connection, lockers for cleaning gear might also be provided in way of all compartments throughout the ship.

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(v) It is suggested that hull plating between "wind and water" be increased in thickness to eliminate the erosion or wear and tear on plating in the vital area caused by contact with camels and floats when berthed along side decks or other vessels. Flotsam is constantly encountered underway and is another destructive agent. A band of rusted thin hull plating, approximately three feet in width, is to be observed on all destroyers after a few years of service. A heavier three foot strake around the ships would eliminate vital parts of the ship being exposed to casualties the rest of the hull could easily withstand.

(w) It has been observed that darker shades of paint seem to have not been flash burned to the same extent that lighter shades of paint were. It has also been noted that this ship, as well as practically all of the other ships, have an excess of various kinds and combinations of paints applied, one on top of the other, to their exterior surfaces. Excessive blistering has therefore resulted that cannot be entirely attributed to the heat from the blast. If available, and produced in fire retardant variety, aluminum paint as a priming coat, would better adhere to prepared surfaces than red lead or yellow chromate. Dark paints, applied over aluminum priming coats, do not blister to the same extent as they do over other primers.

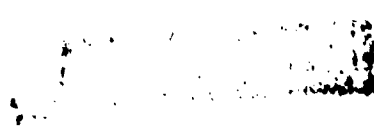
(x) No remarks concerning shock proofing ladders, switch boards, electrical and mechanical units is considered applicable to this class of Destroyer as they were constructed and commissioned prior to World War II.

(y) Regulations might be modified to permit small boats to be swung in at all times at sea. A centerline crane could be used to take boats from the water by means of bridles. The heavy davits, now necessary, could therefore be eliminated. Topside weight could be reduced, firing angles of torpedoes, amidships and after guns increased, and counter-flooding or ballasting against list eliminated. The crane could also be used for loading D.C's, torpedoes, spare parts etc etc., eliminating torpedo cranes and D.C. davits with a further reduction in topside weight. A metal welded boat would also reduce the fire hazard of a wooden boat.

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Classification (~~Secret~~) (Changed to **CONFIDENTIAL**)
By Authority of Joint Chiefs of Staff (Action 15 Apr 49)
By *John Edgar Kent* Date *24 April 51*

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Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

4 April 1997

MEMORANDUM TO DEFENSE TECHNICAL INFORMATION CENTER
ATTN: OMI/Mr Bill Bush

SUBJECT: Declassification of Documents

The following is a list of documents that have been declassified and the distribution statement changed to Statement A, Approved for Public Release.

XRD-41, AD-366731-
XRD-42, AD-366732-
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XRD-39, AD-366729-
XRD-38, AD-366728-
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XRD-6, AD-366698-
XRD-21, AD-366708-
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XRD-22, AD-366709-
XRD-26, AD-366713-
XRD-28, AD-366715-
XRD-29, AD-366727-
XRD-36, AD-366722-

If you have any questions, please call me at 703-325-1034.

Arndith Jarrett

ARDITH JARRETT
Chief, Technical Resource Center